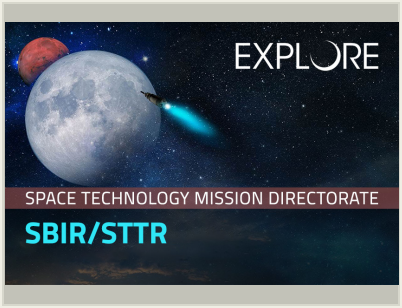
The Integrated Computational Environment for Airbreathing Hypersonic Flight Vehicle Modeling and Design Evaluation, Phase II

Completed Technology Project (2009 - 2011)

Project Introduction

In Phase I the team completed all scheduled initial efforts, 1) evaluation of relevant current simulation capabilities, 2) development of aero-thermo-elastic-propulsion simulation of air-breathing hypersonic flight vehicles (AHFVs) and other flight vehicles, and 3) generation of a set of recommendations for multidisciplinary simulation capability, as planned. Numerical examples of this capability are also presented herein. In Phase II we propose to complete our ongoing effort in the developmental area and further extend the tasks that will include acoustics. This team will complete development of an independent, Multidisciplinary Design and Analysis (MDA) tool, primarily employing their respective numerical, finite element based, computer codes in disciplines as Aerodynamics, Thermal, Structures, Propulsion, Acoustics, and Controls, among others. The resulting MDA code, designed in modular form, could be effortlessly interfaced with existing commercial or user-provided codes, if desired. Once completed, the code is expected to have extensive applications in the design and analysis of flight vehicles with a TRL level of 6 or so. The NASA SBIR/STTR solicitation emphasizes the area of MDA as a current topic of primary importance for ARMD Fundamental Aeronautics Program, and this proposal is highly relevant to such a solicitation.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Advanced Engineering Solutions, Inc.	Supporting Organization	Industry	Ormond Beach, Florida

Primary U.S. Work Locations	
California	Florida

Project Transitions

June 2009: Project Start

September 2011: Closed out

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.5 Mission Architecture, Systems Analysis and Concept Development
    - TX11.5.3 Tools and Methodologies for Vehicle or Concept Definition Activities